



## Development of *My Repro Media* in Learning the Human Reproductive System to Improve Learning Outcomes of High School Students

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### Abstract

With advances in science and information technology, the learning process which initially used conventional learning has shifted to technology-based learning. In the global era, students make smartphones a necessity in life. Android smartphones have a positive impact if the content is filled with educational content and can be used as fun and interesting learning suggestions. The unavailability of android-based learning media in biology lessons on the Human Reproductive System material. The purpose of this research is to develop my repro media in learning the Human Reproductive System in class XI MIPA. The research location is SMA 2 Bae and SMA 1 Bae. The type of research used is research and development. The development model used is the 4D development model. Data collection techniques, namely questionnaires and objective tests in the form of multiple choice totaling 30 questions. My repro media is considered very feasible based on the validation of 86% media experts and 81% material experts. The percentage of eligibility from the teacher and student questionnaire is 87%. My repro media is effective on learning outcomes which are characterized by moderate to high N-Gain values of > 80% of the 95 students.

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## INTRODUCTION

Along with times, the rapid development of science and technology makes the speed of conveying information increasingly limitless. This directly affects all areas of life, including education. Therefore, innovation from educators is needed to align technological developments in the world of education (Cahyani *et al.*, 2022). Education is very important for humans to obtain a decent life. Each country has a different quality of education, education is one of the supporting factors for the success of each country in terms of developing the potential of human resources. Basically in education, students have expertise in their respective fields, so they can develop their potential (Santoso & Ramadhani, 2019).

There are many ways to become a creative teacher in learning, one of which is by utilizing learning media. Using learning media is an inseparable part of the learning process (Elci *et al.*, 2021). Learning media has an important role because it can help the student learning process. The use of learning media in the teaching and learning process can create a new sense of desire, generate motivation, interest and stimulate learning activities, and can also affect students psychologically. With learning media it is more effective in conveying messages and lesson content (Falahudin, 2014)

Learning media is everything that is used to convey subject matter from the teacher to students in the process of learning activities. The use of instructional media attracts students' attention to concentrate more and focus their minds on the content of the subject matter. The teacher accompanies students as a provider of information, because it is their responsibility so that students are more focused in the learning process taking place (Pada *et al.*, 2021). By using learning media students are expected to be innovative, creative and interactive as well as to get rid of boredom in the learning process taking place so that the content of the material is conveyed (Bare *et al.*, 2021). According to Lestari in the Rahmawati & Alimah journal (2022), the use of learning media that utilizes technology becomes more flexible and efficient, students can access the information needed in learning more easily without space and time limits.

By using learning media, learning activities are directed at increasing student activity in the learning process optimally so that students can understand the material and can increase student learning interest. Creative teacher ideas are indispensable for developing media that can produce maximum learning outcomes (Haka & Suhanda, 2018). One example of technological progress at this time is the smartphone. Ownership of an Android smartphone is a trend that is widely used by students. In the global era, students make smartphones a necessity in life. Android smartphones have a positive impact if the contents are filled with educational content and can be used as fun and interesting learning suggestions (Hening *et al.*, 2017).

The use of Android learning media is currently being developed. The existence of Android-based learning media provides an innovation in the field of education in Indonesia (Prasetyo *et al.*, 2021). According to Muyaroah & Fajartia (2020) the advantages of Android-based learning applications are access to learning media that is easy and can be accessed anywhere without having to meet face to face between the teacher and students, so that it does not take up learning time. Users can use the application by downloading via Google Drive which can be directly installed on the user's gadget device. According to Fatmawati *et al.* 2021 the android application is one of the media in learning biology and the results of the research conducted show that the media is suitable for use.

The results of direct observation on a small scale, 17 students in class XI MIPA 1 SMA 2 Bae are smartphone users, while on a large scale, students in class XI MIPA 5.6 and 7 SMA 1 Bae with a total of 95 students are also users. smartphones. This can be used as an opportunity to utilize smartphones as learning media that can improve student learning outcomes. Based on this background, it is intended to conduct media development research on high school student learning outcomes with the title "Development of My Repro Media in Learning the Human Reproductive System to Improve High School Student Learning Outcomes."

## RESEARCH METHOD

The type of research used is research and development (R&D), developing the Android-based My Repro application to improve student learning outcomes in the subject of the human reproductive system.. The development model used is the 4D development model which consists of 4 stages, namely define, design, develop, and disseminate. The sampling technique in this study used purposive sampling. The research was conducted at SMA Negeri 2 Bae in class XI MIPA 1 consists of 17 students and SMA Negeri 1 Bae in classes XI MIPA 5, XI MIPA 6 and XI MIPA 7 consists of 95 students. The research was carried out in the Even Semester of the 2021/2022 Academic Year. Test questions totaling 30 questions with a research design using One Group Pre test and Post test Design.

## RESULTS AND DISCUSSION

My repro is a learning media application on the material of the Human Reproductive System based on the Android operating system for smart cell phones and tablet computers. The my repro application is equipped with learning materials, learning videos, practice questions and games. The development of my repro media has gone through a series of processes of defining, designing, developing and testing activities so that my repro media is said to be feasible if it gets proper criteria from expert validators and my repro media users with feasible indicators and is said to be effective if there is an increase in student learning outcomes with N-Gain indicators medium to high.

### Results of Material Validation on My Repro Learning Media

Material validation on my repro are 3 aspects tested, namely aspects of material competence, aspects of material suitability, and aspects of language clarity. The material competency aspect has indicators: (1) the material is in accordance with basic competencies; (2) the material is in accordance with the competency achievement indicators; (3) the material is in accordance with the learning objectives and (4) the material presented can develop the cognitive domain. Material competency aspects get a score of 19 with a percentage of 95% and get a very decent category. Indicators of aspects of material competence are in accordance with the theory of learning media with learning objectives to be achieved and can develop students' knowledge (Cahyani *et al.*, 2022).

The suitability aspect of the material has indicators: (1) The material in the media is easy to understand; (2) Material in the media is presented efficiently; (3) Pictures are clearly visible so that they help in understanding the material and (4) Pictures are in accordance with the material. The suitability aspect of the material gets a score of 15 with a percentage of 75% and gets a decent category. In accordance with indicators of suitability of material in the Human Reproductive System that can be understood, presented efficiently and pictures on material can help students understand the material (Astuti *et al.*, 2017).

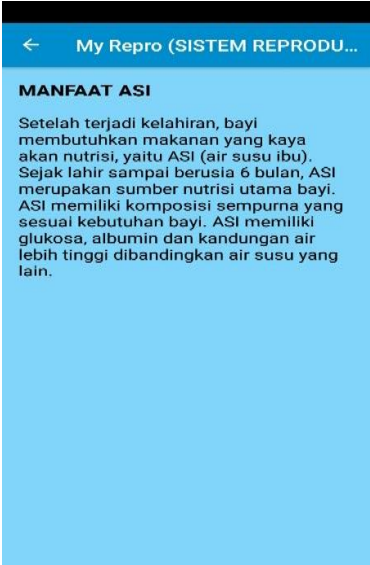
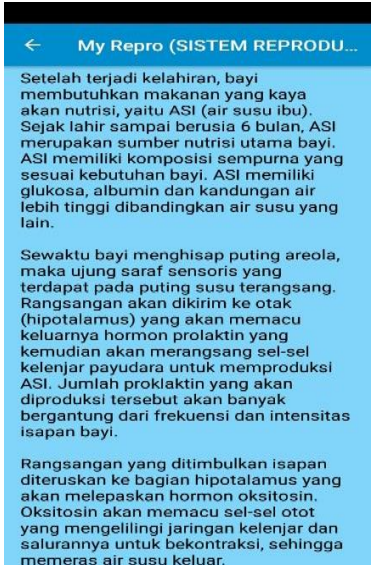
The aspect of language clarity consists of: (1) The language used is easy to understand; (2) the language used is simple; (3) The language used according to the rules of Indonesian is good and correct and (4) The narrative is clear, concise and informative. The aspect of language clarity gets a score of 15 with a percentage of 75% and gets a decent category. In accordance with the indicators that learning media use language that is easy to understand, concise, clear according to Indonesian and informative rules (Zakiy *et al.*, 2018). The recapitulation of the material validation test results can be seen in Table 1.

**Table 1.** Recapitulation of the material validation test results my repro media

Feasibility aspect	Total score	Percentage	Criteria
1. Aspects of Material Competence	19	95	Very Worthy
2. Aspects of Material Suitability	15	75	Worthy
3. Aspects of Language Clarity.	15	75	Worthy
Overall percentage	49	81	Very Worthy

The validation of the material in the learning media was tested on material experts on April 5, 2022, obtaining a total score of 49, with a percentage of 81%, and getting very decent criteria. There are suggestions from the material validator to add material about hormones that work in the mechanism for the formation and release of breast milk when the baby is breastfeeding. This suggestion was immediately implemented so that the learning media was valid. Material revision can be seen in Table 2.

**Table 2.** Material revision

Before revision	After revision
	

### Results of Media Validation on My Repro Learning Media

Media validation on my repro are 3 aspects tested In this test, there are 3 aspects tested, namely software aspects, display aspects, and excellence aspects. The software aspect has indicators: (1) the application can be used easily in its operation; (2) the application is presented simply; (3) the application can be installed easily and (4) the application can be used many times at any time. The software aspect gets a score of 17 with a percentage of 85% and gets a very decent category. These indicators are in accordance with ease of operation, presented simply with a simple interface, easy use of application access and can be used at any time (Astuti *et al.*, 2017).

The display aspect has indicators: (1) background display, image placement does not interfere with the content of the material; (2) The size of the text, images in the media can be seen clearly; (3) The display is clearly visible to all students and (4) The menu layout is correct. The display aspect gets a score of 18 with a percentage of 90% and gets a very decent category. According to Prastowo in Alawiyah *et al* (2021) says that the color selection must be striking in order to attract students' attention, the size of the text in the learning media must be clearly visible and the placement of the button positions must be appropriate so as to increase students' interest in reading.

Aspects of excellence consist of: (1) Presenting attractive and easy-to-follow applications; (2) the media is able to provoke student responses; (3) Media is able to provide explanations coherently and (4) Information or messages can be received easily by students. Aspects of excellence get a score of 17 with a

percentage of 85% and get a very decent category. According to Munir in the journal Alawiyah et.al (2021) which states learning with learning media can provoke student responses and provide information easily accepted by students. Media validation in learning media was tested on media experts on April 7, 2022 to get a total score of 52, with a percentage of 86%. Getting the criteria is very feasible to be tested and there is no revision from the media expert validator. The recapitulation of the media expert test results can be seen in Table 3.

**Table 3.** Recapitulation of the material validation test results my repro media

Feasibility aspect	Total score	Percentage	Criteria
1. Aspects of Software	17	85	Very Worthy
2. Aspects of Display	18	90	Very Worthy
3. Aspects of Excellence	17	85	Very Worthy
Overall percentage	52	86	Very Worthy

### Teacher' Responses to My Repro Learning Media

Distribution of questionnaires containing assessments of Android application media products to teachers. The teacher's response on a small scale shows that the teacher gives a score of 44 with an average percentage of 88%. Under these circumstances, it shows that the teacher is very supportive of the media my repro on the material on the Human Reproductive System. The teacher's response on a large scale shows that the teacher gives a maximum score of 48 with an average percentage of 96%. The teacher is very supportive of using my repro media on the Human Reproductive System material in teaching and learning activities. In line with the research that has been conducted by Yohanes Bare *et al.*, (2021) that android-based learning media is very suitable to be used as a source of teaching materials for teachers in teaching and learning activities.

### Student' Responses to My Repro Learning Media

The student questionnaire numbered 10 statements in the column for the assessment scale of media and teaching materials developed with a Likert scale rating of 1 to 5. Student response questionnaires on a small scale were tested on students of class XI MIPA 1 SMA 2 Bae consisting of 17 students. The recapitulation of student responses on small scale can be seen in Table 4

**Table 4.** Recapitulation of Student Responses on Small Scale

No	Percentage	Criteria	Total
1	81 - 100	Very Worthy	12
2	61 - 80	Worthy	5
3	41 - 60	Decent Enough	-
4	21 - 40	Not feasible	-
5	0 - 20	Very Unworthy	-

Recapitulation of statements from student responses shows that the 10 statements have a total value of 746 with an average percentage of 87% which indicates that all students gave good responses and received positive responses from students. So getting the criteria is very feasible.

Furthermore, a questionnaire was distributed on a large scale to students' responses, testing was carried out on students in class XI MIPA 5, XI MIPA 6 and XI MIPA 7 SMA 1 Bae consisting of 95 students. The

recapitulation of the results of student responses on a large scale to my repro media can be seen in Table 4.5.  
**Table 5.** Recapitulation of student responses on a large scale

Percentage	Criteria	Total			Total	Percentage Total (%)
		XI MIPA 5	XI MIPA 6	XI MIPA 7		
81 – 100	Very Worthy	12	13	12	37	39
61 - 80	Worthy	17	18	19	54	57
41 – 60	Decent	2	2	-	4	4
	Enough					
21 – 40	Not feasible	-	-	-		
0 - 20	Very Unworthy	-	-	-		

Based on the results of the analysis of students' responses to my repro media on a large scale, student responses were obtained with very appropriate criteria of 39%, 57% appropriate and 4% sufficiently feasible. It can be concluded that my repro media is very suitable for use in learning the human reproductive system.

### Effectiveness Test to My Repro Learning Media

The effectiveness test was carried out by testing the pretest and posttest to measure the increase in student learning outcomes. In this study, learning outcomes were used as the dependent variable which involved pretest and posttest in the study. The pretest was given to students before learning to use my repro media began and the posttest was given to students after using my repro media. After the implementation of the posttest, students were given a questionnaire on responses to the my repro media on the Human Reproductive System material. Before conducting trials on a large scale, test questions were carried out to find out the validity test, reliability test, level of difficulty and differentiating power for class XII MIPA 1 SMA 1 Demak students where the subject was not related to the dependent variable of the study.

My repro media can be said to be effective if there is an increase in student learning outcomes from the pretest and posttest scores. Pretest scores were obtained during learning, students did not use my repro media. Meanwhile, posttest scores were obtained during learning, students used my repro media (Cahyani *et al.*, 2022). The subjects used were 95 students from class XI MIPA 5,6 and 7 SMA 1 Bae. The ngain value that has been obtained is then interpreted with the n-gain value criteria. The recapitulation of the results of the large-scale trial n-gain values is presented in Table 4.6 below:

**Table 6.** The recapitulation of the results of the large-scale trial n-gain

Category	XI MIPA 5	XI MIPA 6	XI MIPA 7	% Total
Tinggi	18	20	18	59
Sedang	11	13	13	39
Rendah	2	0	0	2
<b>Percentage Total</b>	33	34	33	

The n-gain test is used to determine the success of students' conceptual understanding of the material (Putra *et al.*, 2018). Based on n-gain analysis data, it can be described that the total percentage for the high category is 59%, medium is 39% and low is 2%. The average n-gain results have a high criterion, so it can be concluded that the my repro media on the Human Reproductive System material can improve student learning outcomes. In line with research by Susilo & Suwahyo (2019) that learning media based on android applications is very effective in improving student learning outcomes as evidenced by the moderate to high n-gain values of > 80%.

## Contribution of Information Processing Theory to Learning Outcomes

Information processing theory has a very important role in the learning process initiated by Robert Gagne. There are three components in information processing, namely sensing registers, short-term memory and long-term memory (Kusaeri, 2018). Information processing theory discusses information received, information managed, information stored and information retrieved (Hidayati, 2018).

Students receive a stimulus by observing and reading material in the my repro application which is given through senses such as sight and hearing. This is in accordance with the research of Suryana *et al.*, (2022) which said that by providing a stimulus that students receive in the form of visual images of material and learning videos. Information received from sensory registers will enter working memory in short term memory. The way to store information in short term memory is to receive information many times. The process of retaining information in short term memory by repeating it is called memorizing (rehearsal). Understanding material is very important in learning, because the longer information stays in short term memory, the greater the chance that the information will be transferred to long term memory (Kusaeri, 2018). Information and experiences stored in long term memory can influence individual perceptions of future stimuli (Amamah *et al.*, 2016). Information and experience that students have obtained can help students solve problems with long term memory.

## CONCLUSION

Based on the results of the analysis and discussion, it is concluded that my repro media learning is considered very feasible based on the validation of 86% media experts and 81% material experts. The percentage of eligibility from the teacher and student questionnaire is 87%. The results of the effectiveness test of my repro media are effective in increasing student learning outcomes as evidenced by the moderate to high n-gain values > 80%.

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